

# A SYNOPSIS OF THE PETIOLATE WASPS OF THE FAMILY EUMENIDÆ (HYMENOPTERA), FOUND IN AMERICA NORTH OF MEXICO.

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The wasps of the family Eumenidæ with petiolate abdomens, found in America north of Mexico are included in two genera, *Eumenes* Latreille and *Zethus* Fabricius. The following synopsis is based on specimens contained in the U. S. National Museum. Of the genus *Eumenes* the Museum contains 11 of the 13 hitherto described species and has large series of specimens of several of these. Of the genus *Zethus* it contains specimens of all of the five described species, but the number of specimens in all species is comparatively small. In addition to the descriptions of new species included in this paper there are redescriptions of the Say and Haldeman species and of a number of other species which it seemed desirable to compare with their allies.

For the sake of clearness, descriptive terms used in this paper which are not usually used by other hymenopterists or whose usage is not always the same, may be defined as follows:

**Length.**—The measurement from the front to the apical margin of the second segment of the gaster.

**Lateral angles of the clypeus.**—The angle produced by the meeting of the apical and lateral margins of the clypeus.

**Pronotal lobes.**—Lobes which project from either side of the prothorax into the mesoepisternum a short distance below the tegulæ.

**Metanotum.**—The simple transverse plate which bears the hind wings. This is the *postscutellum* of many authors.

**Propodeum.**—The tergite of the first abdominal segment which has been fused to the thorax.

**Gaster.**—The abdominal segments after the constriction separating them from the thorax, that is, all of the abdominal segments except the propodeum.

**Petiole.**—The first segment of the gaster, or the **first abdominal segment** of many authors. It is not considered advisable to designate the petiole as distinct from the gaster and preceding it, for with the majority of the species of this family there is no petiole.

**Apical cordon of the petiole.**—The salient margin or rim at the apex of the tergite of the petiole.

**Dorsal angle of the second segment of the gaster.**—The median dorsal line when viewed laterally forms a more or less distinct angle which ordinarily marks the maximum inflation of the segment.

**Lateral angle of the second segment of the gaster.**—The lateral lines when viewed dorsally form a more or less distinct angle as does the dorsal line, which ordinarily marks the maximum lateral inflation of the segment.

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The genera *Eumenes* and *Zethus* are not closely related, yet because of a superficial resemblance they can be conveniently considered together. They may be readily separated from all other wasps of the family Eumenidæ, found in America north of Mexico, by the first segment of the gaster which is petiolate, while in all other genera found within these limits it is sessile or subsessile. In turn these two genera may be separated by the following contrasting characters:

*Eumenes*.—Mandibles long, and sharp pointed; clypeus as long or longer than wide; head compressed transversely, not dilated behind the eyes, posterior face truncate; thorax quadrate, not strongly contracted anteriorly; prothorax nearly as wide as the head; petiole expanded, or at least not strongly contracted apically; second segment of the gaster sessile or subsessile.

*Zethus*.—Mandibles short, obliquely truncated; clypeus wider than long; head dilated behind the eyes, posterior face emarginate; thorax strongly contracted before the tegulæ; prothorax much narrower than the head; petiole strongly contracted apically; second segment of the gaster subpetiolate.

#### Genus *Eumenes* Latrielle.

The genus *Eumenes* as it is found in America north of Mexico forms a very homogeneous group. The differences of groups of species, however constant they may be, do not justify its division into subgenera, and it is probable that if extralimital species were studied that many of these group differences would disappear. However to facilitate the determination of species, those under consideration may be divided into four species groups, which named after the oldest species in each group are as follows: The *smithii* group, the *crucifera* group, the *fraternus* group, and the *crassicornis* group. All of these except the *crucifera* group would fall into Saussure's division Alpha.

#### Key to the Species of *Eumenes*.

1. Dorsum of the petiole impunctate..... *bollii* Cresson  
Dorsum of the petiole distinctly punctate.....2
2. Head flattened dorsally; petiole linear pyriform, without abrupt inflation,  
ventral aspect of the tergite sparsely punctate..... *brunneus* Isely  
Head convex dorsally; petiole pyriform or campanulate, inflation always  
more or less abrupt; ventral aspect of the tergite densely and coarsely  
punctate.....3
3. Sternite of the petiole not distinctly separated from the tergite except near  
the apex; dorsal line of the second segment of the gaster strongly  
curved forward before the dorsal angle.....4  
Sternite of the petiole distinctly separated from the tergite by a groove  
and a carina; the dorsal line before the dorsal angle on the second  
segment of the gaster not strongly curved forward.....6

4. Punctuation on the ventral aspect of the petiole extending up to the margin before the apical broadening of the sternite; a transverse brownish band crossing the middle of the dorsal aspect of the second segment of the gaster..... *smithii* Saussure
- Punctuation on the ventral aspect of the tergite of the petiole not extending up to the margin, except after the apical broadening of the sternite; a transverse yellowish band, (sometimes interrupted), crossing the middle of the dorsal aspect of the second segment of the gaster..... 5
5. A largely brownish wasp..... *belfragei* Cresson
- Brownish, replaced by yellow or golden... *belfragei* subspecies *aureus* Isely
6. Second segment of the gaster depressed (wider than high) or if not distinctly depressed the dorsal angle is surmounted by a boss..... 7
- Second segment of the gaster compressed, or if not distinctly so the dorsal angle is without a boss..... 10
7. Apical emargination of the clypeus shallow, but angular; second segment of the gaster with the dorsal line after the dorsal angle nearly straight with no broad transverse depression before the apex... *stenogaster* Isely
- Apical emargination of the clypeus rounded; second segment of the gaster with the dorsal line after the dorsal angle recurved and with a broad transverse depression before the apex..... 8
8. Second segment of the gaster beyond the lateral angles with the sides parallel, not convergent until near the apex, segment longer than wide. *bolliformis* Viereck
- Second segment of the gaster beyond the lateral angles with the sides convergent, not longer than wide..... 9
9. Apical cordon of the petiole not prominent, no distinct constriction immediately preceding it; abdomen largely yellow... *crucifera* Provancher
- Apical cordon of the petiole prominent, with distinct constriction immediately preceding it; abdomen largely black..... *sternalis* Isely
10. Antennæ comparatively short and stout, reaching about to the tegula; petiole not more than twice as long as wide; sides of the prothorax before the tegulae concave or contracted..... 18
- Antennæ not especially short and stout, as long or nearly as long as the thorax; petiole more than twice as long as wide; prothorax little if ever contracted before the tegulae..... 11
11. Dorsal angle of the second segment of the gaster surmounted by a boss; dorsal line recurved apically..... 12
- Dorsal angle of the second segment of the gaster rounded and without a boss; dorsal line not recurved apically..... 13
12. Second segment of the gaster with two yellow bands, one of which is interrupted..... *cruciferorum* Viereck
- Second segment of the gaster with three yellow bands, two of which are interrupted dorsally..... *tricornis* Isely
13. Second segment of the gaster about half as wide again as the petiole. *enigmatus* Viereck
- Second segment of the gaster at least twice as wide as the petiole..... 14
14. Lateral angles of the clypeus about the same distance from base and apex..... 15
- Lateral angles of the clypeus about twice as far from the base as from the apex; surface of the clypeus coarsely punctate..... 17
15. Surface of the clypeus finely punctate; petiole with lateral teeth visible when viewed dorsally; second segment of the gaster somewhat flattened dorsally, with dorsal and lateral angles distinct; markings yellowish-white..... *globulosus* Saussure
- Surface of the clypeus coarsely punctate; petiole with lateral teeth not visible when the insect is viewed dorsally; second segment of the gaster convex, with dorsal and lateral angles indistinct, about a third longer than wide; markings bright yellow..... *robustus* Isely
- Surface of the clypeus finely punctate; petiole with lateral teeth usually visible when viewed dorsally; second segment of the gaster convex with lateral and dorsal angles indistinct, segment short, little if any longer than wide; markings yellow..... 16

16. Punctations of the first and second segments of the gaster dense; segments of the gaster largely black.....*coloradensis* Cresson  
 Punctations of the gaster sparse; gaster largely yellow.....*xanthogaster* Isely
17. Petiole pyriform, widest at apical margin, more heavily punctate than the second segment of the gaster; markings yellowish-white; no dots on either side of the petiole.....*fraternus* Say  
 Petiole campanulate, widest before apical constriction, as heavily punctate as the second segment; markings of bright yellow; a dot on either side of the petiole.....*verticalis* Say
18. Sides of the prothorax before the tegulae concave; second segment of the gaster with a broad depression before the apex extending to the sides, dorsal line strongly recurved apically, dorsal angle obtuse.  
*crassicornis* Isely  
 Sides of the prothorax contracted before the tegulae, but convergent immediately before the anterior margin of the prothorax; depression on the second segment of the gaster not extending to the sides, dorsal line slightly recurved apically, dorsal angle near a right angle.  
*pachygaster* Isely

## SMITHII GROUP.

The smithii group contains brownish and yellowish species but none that are predominantly black. It differs from the others of the genus by the depth of the furrow of the propodeum, and on the ventral aspect of the petiole by the absence of carinae along the margins of the tergite and the absence or reduction of punctations attaining these margins. *Smithii*, *belfragei* and *bollii* resemble each other in general appearance, and in particular by the shape of the clypeus and by the shape of the second segment of the gaster.

**Eumenes brunneus** new species.

*Male*.—Length, 12.5 mm.; wing, 9.5 mm. Clypeus long and narrow, lateral lines diverging but little apically, apical notch narrow, angular, surface slightly convex, not flattened apically, without brown chitinized median spot above the apex, very finely punctate; head flattened dorsally, densely punctate; thorax stout, nearly as broad as long, slightly rounded in front, strongly convex dorsally and laterally; sides of prothorax immediately before anterior margin, concave; propodeum separated with a deep median furrow; petiole elongate—three times as long as wide at the apex, pyriform, never abruptly inflated, punctations of medium depth, on ventral aspect of tergite sparse and not extending up to the margin; second segment of the gaster a third longer than wide, lateral lines divergent until nearly half-way from base then nearly parallel, transverse depression before median apical margin very slight, finely punctate, more densely apically than basally. General color ferruginous; ferrugino-testaceous on the antennae and third to last segments of the gaster, ferruginous on the thorax and somewhat duller on the second segment of the gaster; wings subhyaline, yellowish-brown; clypeus, mandibles, anterior surface of the scape, emargination of the eyes, a post-ocular line, a wide band on the anterior

margin of the prothorax, a large patch below the tegulæ, tegulæ except a central spot, band on the anterior margin of the scutellum, metanotum, a spot on either side on the propodeum, lower half of the posterior margin of the propodeum, a wide band dorsally on the posterior margin of the petiole and narrower on the second segment of the gaster, indistinct bands on the following two segments, an indistinct cuneiform spot on either side of the second segment, ends of the femora, all of tibiæ and tarsi, yellow; median antennal segments, dorsal aspect of the head, anterior and posterior parts of the mesonotum, margins of the scutellum and the metanotum, ventral parts of the thorax, a stripe running up under the tegulæ, lower part of furrow of the propodeum, petiole except apical band, coxæ, trochanters and basal ends of femora, black. Covered with very fine golden pile.

Colorado. Described from one male.

*Type:* Cat. No. 21377, U. S. National Museum.

Of the North American members of this genus this species is the most distinct. In addition to the differences mentioned in the key it may be distinguished by the unusually long clypeus, the surface of which is convex, not being flattened apically, by the contrasting stoutness of the thorax and slenderness of the gaster, and the general brownish color. Because of the pyriform petiole and the absence of punctation along the ventral margin of the tergite it is placed in this group. A series of specimens including females might place it in a group by itself, but it certainly does not belong in any of the other species groups included in this paper.

#### *Eumenes bollii* Cresson.

*Eumenes bollii* Cresson, E. T., Trans. Amer. Ent. Soc. vol. 4, 1872, p. 232-233—Isely, Dwight, Kans. Univ. Sci. Bul. vol. 8, 1914, p. 252-253, 299-301.

*Bollii* is unique among the North American species by lacking punctations on the dorsal aspect of the petiole, and is further distinguished from the others of the *smithii* group by having a campanulate petiole.

*Distribution.*—This species inhabits southwestern United States and there is one specimen in the U. S. National Museum labeled "Mexico." Specimens from the United States are from the following localities: Brewster Co., Del Rio, Valverde Co., and Waco, McLennan Co., Tex.; Riley Co., Kans.; Rocky Ford, Otero Co., Colo.; Des Moines, Union Co., and Sacramento Mts., Otero Co., N. M.; Huachuca Mts., Ariz.; Reno, Washoe Co., Nev.; San Berdino Co. and Stratford, Kings Co., Calif. The writer has collected it in Ness, Trego, Osborne and Norton counties, Kansas.

*Type*.—Cat. No. 1725, U. S. National Museum.

The writer has collected nests of this species in western Kansas. They were one-celled globular earthen nests, characteristic of this genus and were found singly attached to weed stems.

#### ***Eumenes smithii* Saussure.**

*Eumenes smithii* Saussure, Henri de, Etud. Fam. Vespid., vol. 1, 1852, p. 43, pl. 10, fig. 1; Smithson, Miscel. Coll. No. 254, 1875, p. 104-105.

All records of this species and all specimens I have seen are from Florida.

*Type*.—British Museum of Natural History (according to Saussure).

Nothing has been recorded previously in regard to the nest of *smithii*. In the National Museum is a nest collected by Hubbard labeled Cres City, Fla., from which a wasp of this species was reared. It is a globular earthen nest, with a jug-like mouth, typical of the wasps of this genus. The surface is more granular than that of the nests of *fraternus* and small lumps of earth give it a roughened appearance. It is attached to the lower side of a leaf.

#### ***Eumenes belfragei* Cresson.**

*Eumenes belfragei* Cresson, E. T., Trans. Am. Ent. Soc., vol. 4, 1872, p. 232.—Hartman, Carl, Jour. Animal Behavior, vol. 3, 1913, p. 353-360.

*Female*.—Length, 16.5 mm.; wing, 11.5 mm. Clypeus as long as wide, lateral angles comparatively near the apex, apical emargination angular, surface deeply punctate; head slightly convex above; thorax slightly rounded in front, sides convex; median furrow in propodeum deep; petiole pyriform, never as wide as at the apex, margins of tergite usually meeting ventrally, completely obliterating the sternite except at the apex, no carinae bordering the margins, punctations on ventral aspect not attaining the margin, except at the apex; second segment of the gaster convex, longer than wide, dorsal line before angle strongly curved forward; punctations on head and thorax confluent, less dense on gaster. Largely ferruginous; dorsal aspect of the head, tips of flagella, a spot near the upper middle of the clypeus, mesonotum, lateral aspect of the thorax, basal line on metanotum, median furrow of the prepodium, basal end of the petiole, basal and central aspect of tergite of the second segment of the gaster, black, eyes dull brownish; clypeus, ridge between the antennae, anterior emargination of the eyes, a post-ocular line, anterior margin of the prothorax, a large spot below the tegulae, anterior margin of the scutellum, metanotum, a large oblique spot on each side of the propodeum, apical margin of the petiole, elongate oblique spots on either side of the second segment of the gaster meeting

dorsally, apical margin of second, third and fourth segments, ends of femora, all of tibiae and tarsi, yellow; antennae yellowish-ferruginous; scape yellowish beneath; wings hyaline, brownish. Covered with very fine golden pile.

*Male*.—Length, 13.75 mm.; wing, 9.5 mm. Clypeus narrower. Clypeus, hook of the antennae and apical margin of all segments of the gaster, yellow; oblique spots on sides of the propodeum absent.

*Variations*.—Margins of the tergite of the petiole do not always meet ventrally and in a few specimens the ventral punctations attain the margins of the tergite before the apical divergence. The apex of the tergite of the second segment of the gaster is often much flattened. There is considerable variation in the amount of black and the yellow oblique marks on the second segment of the gaster frequently do not meet on the dorsum.

*Distribution*.—Specimens in the National Museum are from Riley and Franklin Counties, Kansas; La Cuenca, Mora Co., N. M.; Huntersville, Walker Co., Victoria, Victoria Co., Corpus Christi, Nueces Co., Del Rio, Valverde Co., Brewster Co., Pittsburg, Camp Co., Ladonia, Fannin Co., Greenville, Hunt Co., Calvert, Robinson Co., Dallas, Dallas Co., and Cypress Mills, Blanco Co., Texas. These localities in Texas indicate a very general distribution over the state.

*Type*.—Cat. No. 1726, U. S. National Museum.

This species is closely related to *smithii*, so closely that the writer has not been able with all specimens, to separate the two species except by color. The punctuation character used in the key is satisfactory with most specimens, but because of a few exceptions is not entirely dependable.

Hartman has given a detailed description of the building of two nests by wasps of this species, which as far as the writer is aware is the only account of actual nest building of any American *Eumenes*. A few points in his account may be summarized as follows: The nests were typical jug-shaped earthen cells, attached singly to culms of Bermuda grass. Earth for building material was secured from a hard clod, or a hardened place in a path, and was moistened by water carried in the crop. The work of building was done with the mandibles and forefeet. After the base was made, a pellet of earth was spread out as a ribbon around the edge of the nest and then pulled thin to the normal thickness. Oviposition occurred before storing the nest. Geometrid caterpillars were used as food for the wasp grubs.

**Eumenes belfragei** sub species, **aureus** new subspecies.

*Female*.—Like the typical *belfragei* in structure, but differing strikingly in color, due to the replacing of black and ferruginous largely by yellowish-ferruginous and yellow. Black confined to the dorsal aspect of the head, middle of the mesonotum, base of the petiole, anterior margin of the mesosternum, posterior margin of the epimeron and base of the petiole; ferruginous on the mesonotum, petiole and second segment of the gaster, grading to yellowish-ferruginous on the sides and ventral aspect of the thorax; a narrow oblique band on either side of the second segment of the gaster, ferruginous; yellow markings the same as in the typical *belfragei*, except that the entire clypeus, the greater part of the second segment of the gaster and the following segments are yellow.

Brewster Co., Texas. Described from one female.

*Type*.—Cat. No. 21378, U. S. National Museum

## CRUCIFERA GROUP.

This group would fall in Saussure's division Pachymenes, and includes those species with the gaster depressed, the petiole very broad and campanulate, and the wings large. The group can not be distinctly separated from the *fraternus* group; *bolliformis* is distinct from the species of any other group, but *stenogaster* resembles *globulosus*, while *sternalis* might be confused with *coloradensis*.

**Eumenes crucifera** Provancher.

*Eumenes crucifera* Provancher, Abbe L., Faune Hymen. de la Prov. Quebec, 1886, p. 421.

*Distribution*.—Specimens in the National Museum are from Los Angeles Co., Humbolt Co., Folsom, Sacramento Co., and Palo Alto, Santa Clara Co., California.

*Type*.—Cat. No. 1978, U. S. National Museum.

**Eumenes bolliformis** Viereck.

*Eumenes bolliformis* Viereck, H. L., Trans. Am. Ent. Soc., vol. 33, 1907, p. 387-388. Fig.

*Distribution*.—Flagstaff, Coconino Co., Ariz., (Viereck), and Huachuca Mts., Ariz.

*Type*.—Snow Collections, University of Kansas, Lawrence, Kansas.

This species superficially resembles *crucifera*, but is much larger, the gaster is proportionately wider and the second segment more depressed.



***Eumenes stenogaster*** new species.

*Female*.—Length, 13 mm.; wing, 10 mm. Clypeus longer than wide, lateral angles nearer base than in *fraternus*, apical emargination moderately deep, angular, basal emargination narrow, rounded, surface coarsely punctate; thorax truncate in front, convex laterally, median furrow of propodeum deep; petiole campanulate, nearly half as wide at apex as long, punctations deep and of medium density; second segment of the gaster depressed, as wide as long, dorsal angle rounded, lateral angles attained far before the middle, beyond these angles the lateral lines are nearly parallel, punctations as on petiole. Black; clypeus, except a pediculate spot suspended from the basal margin, a line on the anterior aspect of the scape, the ridge between the antennæ, anterior margin of the prothorax, a dot on either side of the anterior margin of the mesonotum in front of the tegulæ, a spot below the tegulæ, an obscure dot on either side of the scutellum, metanotum, large oblique spots on either side of the propodeum, a large spot on either side of the petiole, a broad oblique band on either side of the second segment of the gaster nearly meeting on the dorsum, apical margins of all the segments of the gaster except the last, particularly wide on the second segment broadening into a helmet shaped spot ventrally, ends of anterior and median femora, the same pairs of tibiæ, yellow; all tarsi, ends of posterior femora and posterior tibiæ, testaceous; wings subhyaline, brownish; body covered with dense grayish pile, finer on the second segment of the gaster.

*Male*.—Length, 13 mm.; wing, 10 mm. Clypeus broad for a male, distinctly toothed, gaster less densely and coarsely punctate than that of the female. Clypeus all yellow, tegulæ margined with yellow; hook of antennæ, brown. Otherwise as the female.

Described from one female collected by C. H. T. Townsend, Rio Ruidoso, White Mts., N. M., and one male from Beaver Canyon, Utah.

*Type*.—Cat. No. 21379, U. S. National Museum.

***Eumenes sternalis*** new species.

*Female*.—Length, 12 mm.; wing, 10 mm. Clypeus longer than wide, lateral angle little more than midway from base to apex, slightly convex, flattened apically, apical emargination rounded, basal emargination narrow and shallow, surface finely punctate; thorax convex laterally, median furrow of propodeum shallow; petiole abruptly campanulate, medium width, as wide or wider before apical contraction than after it; second segment of the gaster depressed, a little longer than wide, wide transverse depression before the apex extending to the sides, lateral angles distinct, nearer base than apex, lateral lines beyond angles converging apically; punctations on gaster shallow and of medium density. Black; clypeus except a central spot, a line on the anterior aspect of the scape, the ridge between the antennæ, a very fine post-ocular line, anterior margin of the prothorax, a spot below the tegulæ,

a dot on either side of the scutellum, metanotum, a spot on either side of the propodeum, an obscure dot on either side of the petiole, wide oblique bands on either side of the second segment of the gaster, apical margins of all segments of the gaster, yellow; tips of mandibles, tegulae, and legs, testaceous. Covered with golden pile, long on head and thorax, grading to medium length on the second segment of the gaster.

*Male*.—Length, 11.5 mm.; wing, 10 mm. Clypeus with lateral angle near to a right angle, apical emargination angular, basal emargination deep, much like that of a *fraternus* male. Clypeus yellow.

Described from one female from Beaver Canyon, Utah, and one male from New Mexico.

*Type*.—Cat. No. 21380, U. S. National Museum.

#### FRATERNUS GROUP.

The *fraternus* group is the most homogeneous of all the groups under consideration. While it contains some large species the majority are smaller than those of the two groups previously discussed. With the exception of *cruciferorum* and *tricinclus* which are the odd members of the group, the apical emargination of the clypeus is rounded, the second segment of the gaster is without a boss on the dorsal angle and the resulting apically recurved dorsal line, which characterizes the following group and to a large extent the preceding one. All species have the second segment of the gaster convex and little depressed.

#### *Eumenes fraternus* Say\*.

*Eumenes fraternus* Say, Thomas, Narr. Long's Second Expedition, vol. 2, 1824, p. 344-346.—Harris\*, T. W., Boston Cultivator, vol. 10, 1848, p. 225.—Saussure, Henri de, Etud. fam. Vespidae, vol. 1, 1852, p. 40.—Say, Thomas, Writings of Th. Say. (LeConte, J. L.), vol. 1, 1859, p. 232.—Walsh, B. D. and Riley, C. V., Amer. Ent., vol. 1, 1869, p. 138.—Riley, C. V., Second Ann. Rept. Ins. Mo., 1870, p. 103.—Couper, W., Canad. Ent., vol. 3, 1871, p. 62.—Saussure, Henri de, Smithsonian. Miscel. Coll., No. 254, 1875, p. 95-98.—Riley, C. V., Amer. Ent., vol. 3, 1880, p. 180.—Saunders, S., Rept. Fruit Growers Assoc. Ont., 1882, p. 281.—Provancher, L., Natural. Canad., vol. 13, 1882, p. 144, 678.—Riley, C. V., Third Rept., U. S. Ent. Comm., 1883, p. 117.—Southwick, E. B., Insect Life, vol. 5, 1892, p. 107-108.—Britton, W. E., Eighth Rept. Conn. State Ent., 1909, p. 786.—Smith, J. B., Ann. Rept. N. J. State Mus. for 1909, 1910, p. 669.—Isely, Dwight, Kans. Univ. Sci. Bul., vol. 8, 1914, p. 253-254, 301.—Viereck, H. L., Conn. State Geol. and Nat. Hist. Surv. Bul. 22, 1916, p. 635.

*Eumenes fervens* Saussure, Henri de, Etud. fam. Vespidae, vol. 1, 1852, p. 40.

*Eumenes macrops* Saussure, Henri de, Etud. fam. Vespidae, vol. 1, 1852, p. 41.

*Eumenes minuta* Saussure, Henri de, Etud. fam. Vespidae, vol. 1, 1852, p. 39.

\*Reference not verified by the writer.

*Female*.—Length, 15 mm.; wing, 11.5 mm. Clypeus convex, lateral angles two-thirds distance from base to apex, apical emargination rounded, surface coarsely punctate; head convex above; thorax convex before tegulæ; propodeum with median furrow deep, extending to the metanotum; petiole little more than one-third as wide as long, at first linear then gradually becoming pyriform, widest at apical margin, lateral teeth not visible dorsally, apical margin bordered by a salient cordon before which is a slight constriction; second segment of the gaster convex, not depressed, more finely punctate than the petiole. Black; wide basal margin of the clypeus extending forward along the sides, ridge between the antennæ, anterior aspect of the scape, a post-ocular line, anterior margin of the prothorax, metanotum, a spot on either side of the metanotum on the propodeum, apical margins both dorsal and ventral of the first and second segments of the gaster, dorsal margin of third and fourth segments, an oblique spot on either side of the second segment, a line on the lateral aspect of the tibiæ most prominent on the median pair, yellowish-white; ends of tibiæ and tarsi, piccus; outer margins of tegulæ brownish; wings brownish with violet reflections. Body covered with short, grayish pile.

*Male*.—Length, 12.5 mm.; wing, 10 mm. More slender than female. Clypeus widely divergent apically. Clypeus entirely and nearly all of tibiæ, yellowish-white; hook of antennæ brown; no spots on the propodeum. Otherwise as female.

*Variations*.—This species varies considerably in size, in the depth of the furrow of the propodeum, in the prominence of the lateral teeth of the petiole, which may be observed on a few specimens when viewed dorsally, and in the density and depth of punctation. The markings vary in prominence, particularly in males which frequently have a line on the margin of the fifth segment of the gaster, and more of the legs yellowish-white. There are two varieties with somewhat different markings, which are as follows:

*Variety 1*. Resembles the typical *fraternus*, except as follows: Length, 16.5 mm.; wing, 12.5 mm. Melanistic. No yellowish white on clypeus nor on legs except for a small mark on median tibiæ, nor on third and fourth segments of the gaster. There is a large yellowish-white spot below the tegulæ.

*Variety 2*. Resembles the typical *fraternus*, except as follows: A spot below the tegulæ, spots on the propodeum very large, a dot on either side of the petiole, and apical margins of all segments of the gaster 1 to 5, yellowish white. Because of these variations in markings this variety might be confused with *verticalis*, but it differs in all structural characters. In the National Museum are only three specimens so marked.

*Distribution*.—The writer has seen specimens of the typical *fraternus*, most of which are in the National Museum, from the following localities: Durham, Stafford Co., N. H.; Forest Hills and Boston, Mass.; Lake George, Warren Co., and Long Island, N. Y.; Carlisle Junction, Craighead and Eberly Mills,

Cumberland Co., Campbell, York Co., Heckton Mills, High Spire and Rockville, Dauphin Co., North East, Erie Co., Martie Forge, Lancaster Co., and Philadelphia, Pa.; Cabin John and Plummers Island, Montgomery Co., and Linwood, Carroll Co., Md.; Washington, D. C.; Chain Bridge, Alexandria Co., Dixie Landing, Pohick Run, Newington, and Mt. Vernon, Fairfax Co., Va.; Highlands, Macon Co., N. C.; Jacksonville, Duval Co., Fla.; Holly Springs, Marshall Co., Miss; Lake Charles, Calcasieu Co., La.; Mich.; Corydon, Harrison Co., Borden, Clark Co., and Noblesville, Hamilton Co., Ind.; Riley Co. and Lawrence, Douglas Co., Kans.; West Cliff, Custer Co., Colo.; Dallas, Dallas Co., Denton, Denton Co., Paris, Lamar Co., Victoria, Victoria Co., and Wolf City, Hunt Co., Texas; in the United States and one specimen labeled Canada.

Specimens of the melanistic variety, (No. 1) are from New Orleans, La.; Jacksonville, Duval Co., Fla.; and Victoria, Victoria Co., Texas.

All specimens of variety No. 2 are labeled New Jersey.

To the states listed above, Connecticut may be added, as the species is recorded from that state by both Viereck and Britton.

*Neotype*.—Determined by the writer. U. S. National Museum.

This species is larger and more slender than any other belonging to this group and the petiole is pyriform while with the others it is more or less distinctly campanulate. In these respects it resembles the species of the *smithii* group.

*Fraternus* is the commonest of the American species and its habits are the best known. Accompanying Say's original description of the species is also a description of the globular nest with the opening terminated by a jug-like mouth. The nest has subsequently been described by a number of observers, and is known to occur singly or in groups of 2 to 5, on the surface of stones or leaves or attached to twigs or weed stems. Lepidopterous larvæ are stored as food for the wasp grubs. According to Say they store nocturnal Lepidoptera; Harris records the storing of canker-worms (*Anisopteryx vernata* Peck.); Norton in a note in Saussure's Synopsis records the storing of green diurnal Lepidoptera; Southwick describes the destruction of the parsnip web-worm (*Depressaria heraclina* De G.)

**Eumenes verticalis** Say.

*Eumenes verticalis* Say, Thomas, Narr. Long's Second Expedition, vol. 2, 1824, p. 346.—Saussure, Henri de, Etud. fam. Vesp. vol. 1, 1852, p. 41.—Say, Thomas, Writings of Th. Say (LeConte, J. L.), vol. 1, 1859, p. 233-234.

*Female*.—Length, 11.75 mm.; wing, 9.25 mm. Similar to *fraternus*, from which it differs as follows: Thorax stouter, furrow of the propodeum shallow, scarcely reaching the metanotum; petiole and second segment of the gaster wider in proportion to length than those of *fraternus*, petiole distinctly campanulate, widest before apical constriction, apical constriction and apical cordon more pronounced than with *fraternus*; second segment of the gaster about as coarsely punctate as the first. Black, but less shining than *fraternus*; basal half of clypeus extending forward along the sides, greater part of the tegulæ, a spot below the tegulæ, an oblique mark on the propodeum on either side of its jointure with the petiole instead of higher on either side of the metanotum as in *fraternus*, apical margins dorsal and ventral of all segments of the gaster from one to five, a dot on either side of the petiole, an elongate oblique mark on either side of the second segment of the gaster instead of a spot, ends of femora and greater part of tibia, and all other markings found on *fraternus*, bright yellow instead of yellowish white; tarsi testaceous; center of tegulæ rufous; wings brownish. Covered with pile of medium length.

*Male*.—Length, 10 mm.; wing, 7.5 mm. Clypeus entirely yellow; no spot below the tegulæ nor on the propodeum. Otherwise like the female.

*Variations*.—The amount of yellow on the clypeus is variable. The spot below the tegulæ is absent on about half the specimens at hand, one lacks the marks on the propodeum and another lacks the dots on the petiole. The yellow on the segments of the gaster varies with individuals.

*Distribution*.—The species was described by Say from Pennsylvania. The National Museum contains specimens from the following localities: Forest Hills, Suffolk Co., Mass.; Philadelphia, Pa.; Chain Bridge and East Falls Church, Alexandria Co., Va.; Ind.; Mo.; Volga, Brookings Co., S. D.; and West Cliff, Custer Co., Colo.

*Neotype*.—Determined by the writer. U. S. National Museum.

This species is often confused with *fraternus* in collections, with which Dalla Torre (Catalog. Hymen; vol. 9, 1894, p. 33), suggests that it is a possible synonym. The two species are readily separated by their difference in size, by the structure of the first and second segments of the gaster, by the color and color pattern.

**Eumenes globulosus** Saussure.

*Eumenes globulosus* Saussure, Henri de, Etud. fam. Vesp. Supplement, 1859, p. 139; Smithson. Misc. Coll., No. 254, 1875, p. 101-102.—Smith, J. B., Ann. Rept. N. J. State Mus., for 1909, 1910, p. 669.

*Female*.—Length, 13.5 mm.; wing, 10 mm. Like *fraternus* from which it differs as follows: Clypeus with lateral angles slightly nearer apex than base, apical emargination more shallow, surface finely punctate; furrow in the propodeum inconspicuous, not extending upward to the metanotum; petiole campanulate, nearly half as wide as long, lateral teeth visible dorsally, no conspicuous contraction before the apical cordon; second segment of the gaster nearly as wide as long with the dorsal angle abrupt, more flattened dorsally and more finely punctate than *fraternus*. Black; larger part of clypeus, a spot on the tegulæ, a spot below the tegulæ, the spot on either side of the second segment of the gaster elongated into an oblique line, apical margins of all segments of the gaster 1 to 5, yellowish-white; ends of tibiae, tarsi and wings brown. Covered with grayish pile of medium length and density.

*Male*.—Length, 10 mm.; wing, 8.25 mm. Differs from the female as follows: More slender, clypeus narrower, with lateral angles less prominent than those of *fraternus*. Clypeus entirely, and the margin of the sixth segment of the gaster and more surface of the legs, yellowish-white. Spots below the tegulæ and on the sides of the propodeum absent.

*Distribution*.—The range of this species overlaps that of *fraternus* and extends north of it. Saussure records it from Illinois and Wisconsin in the United States and from Great Slave Lake in Canada. In the National Museum are specimens labeled as follows: Waldoboro, Lincoln Co., Me.; Durham, Strafford Co., N. H.; Mass.; N. J.; Ind. and Mich; in the United States, and Montreal, Province of Quebec, and a number of other specimens simply labeled Canada.

*Type*.—Probably in the Museum of Geneva, Switzerland.

Like *verticalis*, this species is frequently confused with *fraternus*. In many respects it is much like both of the above species and also like *coloradensis*. The clypeus in general shape and in its fine punctation resembles *coloradensis* rather than *fraternus* or *verticalis*. The campanulate petiole resembles that of *verticalis* and *coloradensis*, while the prominence of the teeth of the petiole resembles that of *coloradensis* and is unlike that of the others. It resembles *fraternus* and differs from the other two by having the second segment of the gaster less distinctly punctate than the petiole, by the shining black color and markings of yellowish-white, instead of bright yellow.

The color pattern, however, is more like that of *verticalis* and on none of the four species are the markings as extensive as on *coloradensis*. *Globulosus* is unique among the four species by the failure of the furrow of the propodeum to extend upward to the metanotum and by the broader and more depressed second segment of the gaster.

***Eumenes coloradensis* Cresson,**

*Eumenes coloradensis* Cresson, E. T., Rept. Geog. and Geol. Surv. West of the 100th Meridian, vol. 5, 1875, p. 717-718.

*Distribution*.—Described from Colorado. In the National Museum are specimens from West Cliff, Custer Co., Colo.; Beulah, San Miguel Co., Hell's Canyon and White Mts., N. M.; and Beaver Canyon, Fremont Co., Idaho.

*Type*.—In Museum of the Philadelphia Academy of Natural Sciences. (According to Cresson).

***Eumenes xanthogaster* new species.**

*Male*.—Length, 10.75 mm.; wing, 8.25 mm. Clypeus narrow, lateral angles obtuse, almost as near to base as to apex, apical emargination rounded, basal emargination deeper than that of *fraternus*, surface finely punctate; thorax truncate in front, convex laterally; furrow of propodeum of moderate depth; petiole campanulate, widest before apical constriction, inflation more abrupt than that of *fraternus*, lateral teeth not visible from above, punctations deep and sparse, second segment of the gaster as wide as long, dorsal and lateral lines convex, punctations finer than on first segment becoming more dense apically. Black; clypeus, anterior aspect of the scape, ridge between the antennæ, a very short post-ocular line, anterior margin of the prothorax, outer margin of the tegulæ, a spot below the tegulæ, a spot on either side of the scutellum, metanotum, a spot on either side of the petiole, a narrow band on the apex, on the second segment of the gaster large elongate lateral spots nearly meeting dorsally and confluent with the wide apical band, ventrally the apical two-thirds of the second segment of the gaster, and the succeeding segments, both dorsally and ventrally, except basal black bands, yellow; ends of femora, all of tibiæ and tarsi, testaceous; wings brownish. Pile very fine on clypeus, long on the dorsal aspect of the head and thorax, and grading to fine on the second segment of the gaster.

Los Angeles Co., Calif. Described from three males collected by the late D. W. Coquillet.

*Type*.—Cat. No. 21381, U. S. National Museum.

This species is closely allied to *coloradensis* but in addition to the characters mentioned in the key it may be distinguished

by the smaller lateral teeth on the petiole which can not be seen when the insect is viewed dorsally, and by the slightly shorter second segment of the gaster.

***Eumenes robustus* new species.**

*Female*.—Length, 13.5 mm.; wing, 11.25 mm. Clypeus longer than wide, lateral angle midway between base and apex, apical emargination rounded and very shallow, surface densely and coarsely punctate; thorax convex; propodeum with median furrow shallow; petiole campanulate but not distinctly so, linear for nearly half its length then becoming comparatively wide, widest at apex, lateral teeth not visible dorsally; second segment convex when viewed either dorsally or laterally, angles not distinct; punctations of the petiole of medium coarseness and density, finer and sparser on the second segment. Black; clypeus except a central spot, a line on the anterior aspect of the scape, a ridge between the antennæ, anterior margin of the prothorax, tegulæ except a central spot, a spot below the tegulæ, a spot on either side of the scutellum, metanotum, a spot on the propodeum on either side of the metanotum, a spot on either side of the petiole, a large oblique cuneiform spot on either side of the second segment of the gaster, apical cordon of the petiole, wide apical margin of the second segment both ventral and dorsal, and the succeeding segments except the basal margins of the sternites, legs beyond the bases of the femora, yellow; a spot in the center of the tegulæ, rufous; wings hyaline with golden reflections. Body covered with fine golden pile.

*Male*.—Length, 13.5 mm.; wing, 11 mm. Clypeus narrow, with lateral angle much nearer apex than base, yellow; hook of antennæ, brown; no yellow on propodeum. Otherwise as female.

Described from one female from Beulah, San Miguel Co., N. M.; and from one male from Williams, Coconino Co., Ariz. The National Museum also has specimens from Ft. Collins, Larimer Co., Colo. and from Oregon.

*Type*.—Cat. No. 21382, U. S. National Museum.

Although not as long as *fraternus* this species is the most robust in the group. This character and the distinct markings readily distinguish this species from any of the others.

***Eumenes enigmatus* Viereck.**

*Eumenes enigmatus* Viereck, H. L., Trans. Am. Ent. Soc., vol. 33, 1908, p. 389, pl. 12.

*Distribution*.—Flagstaff, Coconino Co., Ariz. (Viereck); Ornsby Co., Nev.; Boulder Co., and Florissant, Teller Co., Colo.

*Type*.—Snow Collections, University of Kansas, Lawrence, Kansas.



***Eumenes cruciferorum* Viereck.**

*Eumenes cruciferorum* Viereck, H. L., Trans. Am. Ent. Soc., vol. 33, 1908, p. 388-389, pl. 13.

*Distribution*.—Flagstaff, Coconino Co., Ariz. (Viereck); Pecos, San Miguel Co., N. M.

*Type*.—Snow Collections, University of Kansas, Lawrence, Kansas.

***Eumenes tricinctus* new species.**

*Female*.—Length, 11 mm.; wing, 8.5 mm. Clypeus slightly longer than wide, apical emargination of moderate depth, obtusely angular, basal margin slightly incurved, punctations shallow and dense; thorax truncate in front, sides between anterior margin and tegulæ little convex; furrow of propodeum shallow; petiole campanulate, two-fifths as wide as long, inflation gradual beginning about halfway from base; second segment of the gaster longer than wide, dorsal and lateral lines convex, dorsal angle surmounted by a boss or hump making it higher than the apical part of the segment, dorsal line recurved apically, depression before apical margin wide extending to the sides; punctation on the gaster medium. Black; clypeus except a black spot in the center, a ridge between the antennæ, a line on the anterior aspect of the scape, a post-ocular line, a band on the anterior margin of the prothorax, oblique bands on the anterior margin of the mesonotum, tegulæ, spots below the tegulæ, anterior half of the scutellum, metanotum, convexities of the propodeum, a large spot on either side of the petiole confluent with the band on the apical margin, three wide bands on the tergite of the second segment of the gaster, two of which are interrupted medially, the apical one entire, the ventral part of the segment and all of the succeeding segments except basal black bands, ends of femora and all of tibiæ, yellow; tarsi, testaceous; wings, hyaline, brownish; pile long on the head and thorax grading to fine on the second segment of the gaster.

Oregon. Described from two females. The National Museum also has one specimen from Los Angeles Co., California.

*Type*.—Cat. No. 21383, U. S. National Museum.

This is a slender wasp, closely related to *cruciferorum*.

**CRASSICORNIS GROUP.**

These two species are readily distinguished from the others discussed in this paper by their general stoutness, the thick, short antennæ, the stoutness of the thorax and the gaster, and the abruptness of the dorsal angle and the recurved dorsal line of the second segment of the gaster. They are related to *iturbide* Saussure.

**Eumenes crassicornis** new species.

*Male*.—Length, 11.5 mm.; wing, 9 mm. Clypeus very wide for a male, as wide as long, apical emargination angular, basal margin slightly incurved, punctation medium; antennæ comparatively short and stout, reaching back to tegulæ; thorax stout, truncate in front, sides of prothorax from anterior margin to tegulæ concave; furrow of the propodeum wide and deep; petiole only twice as long as wide, much the widest at the apex with no distinct contraction before it, comparatively flat, punctations medium; second segment of the gaster as wide as long, convex dorsally, dorsal angle abrupt, dorsal line strongly recurved apically, transverse depression before the apex extending to the sides, punctations fine and of medium density. Black; a wide median, longitudinal band covering two-thirds of the surface of the clypeus, a dot between the antennæ, a fine post-ocular line, anterior margin of the prothorax, posterior margin of the tegulæ, a line on the posterior of the metanotum, a very small dot on either side of the first and second segments of the gaster, dorsal apical margin of the segments of the gaster one to four, and the ventral margin of the second segment, a longitudinal band on the anterior tibiæ, ends of femora and all of tibiæ of middle and posterior legs, yellow; hook of antennæ, tegulæ, tarsi and wings, brown. Grayish pile, tinged with golden, long and dense on the head and thorax, shorter on the petiole and fine on the second segment of the gaster.

Goldstream, British Columbia, Dominion of Canada. Described from one male specimen. The National Museum has also one specimen from Seattle, Wash.

*Type*.—Cat. No. 21384, U. S. National Museum.

This species is the most nearly black of any known to the writer within the geographical limits prescribed by this paper. It is the only male with black on the clypeus, and the only species besides *pachygaster* lacking the yellow ridge between the antennæ and the line on the scape, while the dots on the sides of the second segment of the gaster are so obscure that they might readily be missed altogether.

**Eumenes pachygaster** new species.

*Female*.—Length, 11.5 mm.; wing, 9 mm. Clypeus as long as wide, apical margin nearly truncate, with slightly rounded emargination, punctations of medium depth and sparse; antennæ comparatively short and stout, reaching back about to the tegulæ; thorax truncate in front, sides convex, but contracted immediately before the tegulæ; furrow of the propodeum not deep; petiole short, less than twice as long as wide at the apex, campanulate with distinct contraction before the apex, punctation of medium depth and distribution extending to the ventral margins of the tergite; second segment of the gaster almost cubical,

wider than and as high as long, dorsal angle near to a right angle, dorsal line recurved apically, transverse depression before the apex broad, but not extending to the sides, punctations fine and of medium density. Black; basal third of clypeus, a spot between the antennæ, a post-ocular line, anterior margin of the prothorax, the greater part of the tegulæ, metanotum, a spot on either side of and below the metanotum on the propodeum, a dot on either side and the margin of the petiole, a wide oblique line on either side of the second segment of the gaster, posterior margins of the second to fifth segments, a dot on either side of the apical margin of the sternite of the second segment, tips of the femora and a band on the tibiæ, yellow; a spot on the tegulæ, and tarsi, brown; wings, hyaline, brownish. Pile grayish, fine and sparse on clypeus, dense on the scape, long and dense on the head, medium on thorax and gaster.

Mountain View, Santa Clara Co., Calif. Described from three females collected by W. H. Ashmead. These specimens were marked as a new species by Dr. Ashmead. In the National Museum is another specimen from Menlo Park, San Mateo Co., Calif.

*Type*.—Cat. No. 21385, U. S. National Museum.

#### SPECIES NOT INCLUDED IN THE ABOVE

There are two described species which are found within the geographical limits prescribed for this paper, which the writer has not seen, for which reason they are not included in the tables and discussion of species. They are as follows:

##### ***Eumenes marginilineatus* Viereck.**

*Eumenes marginilineatus* Viereck, H. L., Trans. Em. Ent. Soc., vol. 33, 1908, p. 381.

*Distribution*.—Estes Park, Larimer Co., Colo. (Type locality).

*Type*.—Snow Collections, University of Kansas, Lawrence, Kansas.

##### ***Eumenes globulosiformis* Viereck.**

*Eumenes globulosiformis* Viereck, H. L., Trans. Am. Ent. Soc., vol. 33, 1908, p. 386-387.

*Distribution*.—Thomas' Ranch, Oak Creek Canyon, near Flagstaff, Coconino Co., Ariz. (Type locality).

*Type*.—Snow Collections, University of Kansas.

Genus *Zethus* Fabricius.

The five representatives of this genus found in America north of Mexico are readily divided into two groups which may be called after the oldest species in each, the *spinipes* group and the *poeyi* group. The first would fall into the Division *Zethusculus* Saussure and the second into the Division *Didymogastra* Perty. Saussure regarded the separation of the latter division from the former, which was based on the different lengths of the subpetiole, as "entirely empirical and should not be preserved except to facilitate the determination of species." However with the limited number of species covered by this paper the two groups are quite distinct.

Key to the Species of *Zethus*.

1. Robust species; clypeus triangular; depth of head behind the eyes greater than before their hind margin; concavity of the propodeum wide; small spines on the lateral aspect of the middle and posterior tibiae; petiole constricted apically, gaster black or blackish (*spinipes* group).....2
- Slender species; clypeus oval; depth of head behind the eyes less than before their hind margin; concavity of the propodeum not pronounced; no spines on the lateral aspect of the tibiae; petiole much narrowed, but not constricted apically; gaster after the subpetiole reddish (*poeyi* group)....4
2. Petiole half as wide as long, greatest width nearer the apex than the base; area on the mesonotum adjacent to the tegulae not distinctly defined, sparsely punctate.....3
- Petiole much more inflated, two-thirds as wide as long, greatest width nearer the base than the apex; area on the notum adjacent to tegulae distinctly defined and impunctate.....*substricta* Haldeman
3. Pronotal lobe impunctate basally; little yellowish on dorsal aspect of the thorax.....*spinipes* Say
- Pronotal lobe densely punctate basally; much yellowish on the dorsal aspect of the thorax.....*variegatus* Saussure
4. Clypeus without teeth apically.....*poeyi* Saussure
- Clypeus with three teeth apically.....*slossonæ* Fox

*Zethus spinipes* Say.

*Zethus spinipes* Say, Thomas, Bost. Jour. Nat. Hist., vol. 1, 1837, p. 387-388.—Saussure, Henri de, Etud. fam. Vespid., vol. 3, 1854, p. 122.—Say, Thomas, Writings of Thomas Say, (LeConte, J. L.), vol. 2, 1859, p. 767.—Saussure, Henri de, Smithsonian, Miscel. Coll. No. 254, 1875, p. 29.

*Eumenes pennsylvanica* Haldeman, S. S., Proc., Phila. Acad. Sci., vol. 6, p. 365.

*Female*.—Length, 14.75 mm.; wing, 12.5 mm. Mandibles 4-toothed, first tooth distinctly longer than the second; clypeus roughly triangular, nearly twice as wide as long, basal margin narrow, concave, sides slightly convex, somewhat indented by the insertion of antennae, and widely divergent apically, apical lateral margin not distinctly separated from the genae, apical margin truncate, with two small teeth, surface strigose in median portion, coarsely punctate elsewhere; small carinae on inner margins of insertion of antennae, area between the antennae strigose; head greatly inflated behind the eyes, deeper behind the eyes than before their hind margin; pronotal lobe impunctate; mesonotum

with a median carina extending backward from the anterior margin, and two impressed lines extending forward from the posterior margin dividing it into three equal parts; adjacent to the tegulæ is a sparsely punctate area indistinctly defined by an impressed line; scutellum divided by a median impression; petiole twice as long as wide, at first linear then inflated, greatest width distinctly nearer apex than base, apical cordon distinct with three depressions immediately before it, deeply but not densely punctate; second segment of the gaster subpetiolate, nearly as wide as long, tergite finely and sparsely punctate, sternite finely and comparatively densely punctate; lateral aspect of median and hind tibiæ with irregular rows of spines. Black; a spot on the clypeus on either side of the basal margin, carinæ on inside margin of the insertion of the antennæ, an indistinct mark on either side of the anterior margin of the prothorax, apical margin of the tegulæ, a dot on either side of the metanotum, apical cordon of the petiole, margin of the second segment of the gaster, yellow; legs becoming brownish toward tarsi; wings brownish with violet reflections.

*Distribution*.—Originally described from Indiana. Saussure records its distribution as follows: Conn., Pa., Ill., Tenn., Ind. and Fla. The neotype is from Harrison Co., Ind., collected by Harold Morrison. The National Museum also contains other specimens from Washington, D. C.

*Neotype*.—Determined by the writer. U. S. National Museum.

#### *Zethus variegatus* Saussure.

*Zethus variegatus* Saussure, Henri de, Etud. fam. Vespidae, vol. 1, 1852, p. 13-14, Rev. and Mag. Zool., vol. 10, 1858, p. 66.

*Zethus bicolor* Saussure, Etud. fam. Vespidae, vol. 1, 1852, p. 17.

*Zethus spinipes*, var. *variegatus* Saussure, Smithson. Miscel. Coll., No. 254, 1875, p. 30.

*Female*.—Length, 14.5 mm.; wing, 12.5 mm. Differs from *spinipes* as follows: Pronotal lobes densely punctate basally. Dorsal aspect of the prothorax, a large spot under the tegulæ, scutellum except margins and the median line, metanotum, large spots on the convexities of the propodeum, wide apical margin of the tergite of the petiole, apical margins of the tergites of the second and third segments of the gaster, and the ventral margin of the second segment, yellowish; legs brownish.

*Male*.—Length, 13.75 mm.; wing, 10.25 mm. Differs from the female as follows: More slender. Clypeus punctate, not rugose, yellow except lateral and basal margins; antennæ hooked.

*Distribution*.—Originally described from Pennsylvania. Specimens in the National Museum are from the following localities: Md; Va; S. C; Tifton, Tift Co., Ga; and Victoria, Victoria Co., Dallas, Dallas Co., Texas; and Washington, D. C.

*Type*.—According to Saussure in the collection of M. de Romand.

The color differences between this species and *spinipes* are striking, and as far as the writer has observed, there is no tendency for the markings to intergrade. This wasp was first described by Saussure, although he later regarded it as a color variety of *spinipes*. While the writer might hesitate to establish a new species based on characters of punctation and color with a small series, yet since the species has been named it would seem preferable to preserve the name until the characters upon which it is based are shown to be unstable.

#### **Zethus substrictus** Haldeman.

*Zethus substrictus* Haldeman, S. S., Proc. Phila. Acad. Nat. Sci., vol. 2, 1844, p. 54.—Saussure, Henri de, Etud. fam. Vespidae, vol. 3, 1854, p. 152.

*Zethus spinipes* var. *substrictus*, Saussure, Henri de, Smithsonian Miscel. Coll., No. 254, 1875, p. 30.

*Female*.—Length, 16.5 mm.; wing, 13.75 mm. Differs from *spinipes* as follows: Mesonotum with median carina more distinct, area just within tegulae distinctly defined by a depressed line, impunctate; petiole two-thirds as wide as long, sublinear at basal end and then rapidly inflated, greatest width nearer base than apex, apical cordon distinct with only one depression before it, punctations less distinct; second segment of the gaster longer after the subpetiole. Black; no spots on the clypeus and metanotum; a line on either side of the anterior margin of the prothorax instead of an indistinct mark, a spot on either side below the tegulae, a spot on either side of the furrow of the propodeum, yellow; antennae beyond the scape and all of legs, brownish.

*Male*.—Length, 13.75 mm.; wing, 10.5 mm. Differs from the female as follows: Basal line of the clypeus wider and more nearly truncate, surface punctate and not strigose, petiole more slender. Black; apical half of clypeus, anterior aspect of the scape of the antennae, apical margin of the third segment of the gaster, yellow; antennae, gaster and tegulae, brownish; no spot on the anterior margin of the prothorax, below tegulae, nor on propodeum.

*Distribution*.—Pennsylvania and Long Island, New York.

*Neotype*.—Determined by the writer, in the U. S. National Museum.

#### **Zethus poeyi** Saussure.

*Zethus poeyi* Saussure, Henri de, Rev. and Mag. Zool., vol. 9, 1857, p. 270; Smithsonian Miscel. Coll., No. 254, 1875, p. 45-47.

*Distribution*.—Cuba. (Saussure). The National Museum has three specimens from Tavenier, Largo Key, Fla., collected by Frederick Knab.

*Type*.—Probably in the Museum of Geneva, Switzerland.

#### **Zethus slossonæ** Fox.

*Zethus slossonæ* Fox, W. J., Ent. News, vol. 2, 1892, p. 29-30.

*Distribution*.—Punta Gorda, De Soto Co., (Fox), Jacksonville, Duval Co., Miami, Dade Co., Fla.

*Type*.—Cat. No. 1855, U. S. National Museum.